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09/063 924

Filed

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#13

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US006263798B1

(12) **United States Patent**
Benini(10) **Patent No.:** **US 6,263,798 B1**
(45) **Date of Patent:** **Jul. 24, 2001**(54) **FRANGIBLE METAL BULLETS,
AMMUNITION AND METHOD OF MAKING
SUCH ARTICLES**(75) **Inventor:** **Joseph C. Benini, Kersey, PA (US)**(73) **Assignee:** **SinterFire Inc., Kersey, PA (US)**(*) **Notice:** Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.(21) **Appl. No.:** **09/617,909**(22) **Filed:** **Jul. 17, 2000****Related U.S. Application Data**(62) Division of application No. 09/186,366, filed on Nov. 5,
1998, now Pat. No. 6,090,178, which is a division of
application No. 09/063,924, filed on Apr. 22, 1998, now
abandoned.(51) **Int. Cl.⁷** **F42B 3/00**(52) **U.S. Cl.** **102/430; 102/517; 75/246**(58) **Field of Search** **75/245, 246, 247;
419/44; 102/517, 430**(56) **References Cited****U.S. PATENT DOCUMENTS**

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(57)

ABSTRACT

A frangible metal article such as a bullet and a method for making it. The frangible metal article is formed from a mixture of metal particles and metal or metalloid binder material which is compacted into the desired shape, heated to a temperature above that needed to form at least one intermetallic compound but below the temperature of joining of the metal particles by sintering and below the temperature of formation of substantial amounts of a ductile alloy of the metal of the particles and the metal or metalloid binder material and then cooled. When such articles are formed into bullets they have sufficient strength to maintain their integrity during firing but disintegrate into powder on impact and can be formulated to be lead-free.

10 Claims, 1 Drawing Sheet